UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
HERNANDEZ, NELSON D

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>29 April 2008</u>.
2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>26-28,30-35,37,38 and 40-48</u> is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) <u>26-28,30-35,37,38 and 40-48</u> is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on <u>10 February 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☐ All   b)☐ Some * c)☐ None of:
      1.☐ Certified copies of the priority documents have been received.
      2.☐ Certified copies of the priority documents have been received in Application No. _____.
      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

DETAILED ACTION

Response to Amendment

1.   The Examiner acknowledges the amended claims filed on April 29, 2008.

Claims 26, 28, 30, 31, 33-35, and 37 have been amended. **Claims 1-25, 29, 36, 39,**

and 49-56 have been canceled.

Response to Arguments

2.   Applicant's arguments with respect to **claims 26 and 37** have been considered

but are moot in view of the new grounds of rejection.

3.   Applicant's arguments, see page 10, filed April 29, 2008, with respect to the

rejections of **claim 44** under 35 U.S.C. 102(a) have been fully considered and are

persuasive. Therefore, the rejection has been withdrawn. However, upon further

consideration, a new ground of rejection is made in view of previously presented prior

art.

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

5.   **Claims 26-28, 30-35, 37, 38, 40 and 42-48 are rejected under 35 U.S.C. 103(a)**

as being unpatentable over Denyer et al., WO 97/20434 in view of Okada, US

Patent 6,133,953.

        Regarding claim 26, Denyer et al. discloses an imager (See figs. 3 and 4),

comprising: a semiconductor substrate (by teaching that the imaging array is located in

a chip, Denyer et al. discloses a semiconductor substrate; see page 13, lines 1-22); an

array of photosensitive sites (fig. 3 shows an array of pixels 2) located on the substrate,

the array including a plurality of first photosensitive sites (the array in Denyer et al. is

divided into three kind of photosensitive sites (red, green and blue); see fig. 2; page 10,

line 23 – page 12, line 32), wherein each first photosensitive site is configured to

measure the level of a first spectral component (i.e. green light) in light received by the

respective first photosensitive site, and a plurality of second photosensitive sites,

wherein each second photosensitive site is configured to measure the level of a second

spectral component in light received by the respective second site (the array in Denyer

et al. is divided into three kind of photosensitive sites (red, green and blue); see fig. 2;

page 10, line 23 – page 12, line 32. This teaches at least a plurality of second

photosensitive site configured to measure the level of a second spectral component in

light received by the respective second site as claimed); an interpolator (Denyer et al.

discloses a processing unit (Fig. 4: 28) to perform color interpolation to the red, green

and blue signals to form synchronous, parallel color channel signals for the video signal

before being output to a display unit (Fig. 4: 30); page 11, line 33 – page 12, line 25)

located in the substrate (Denyer et al. discloses that the processing unit can be

incorporated in the same chip, where the imaging array is located; page 13, lines 1-22)

and configured to estimate the level of the different spectral components for each of the

photosensitive sites based on an interpolation process using at least one level of

spectral component from another site by performing interpolation configured to estimate

the level of the first spectral component in the light received by at least one of the

second photosensitive sites based on at least one measurement of the first spectral

component obtained respectively by at least one of the first photosensitive sites (Denyer

et al. discloses reconstructing the image colors of each pixels by performing

interpolation to obtain an RGB value for each pixel location) (Page 10, line 23 – page

13, line 22).

Although Denyer et al. discloses performing interpolation to reconstruct the

image to produce a fur RGB image, Denyer et al. does not explicitly disclose that

estimating the level of the first spectral component in the light received by at least one

of the second photosensitive sites based on at least one measurement of the first

spectral component obtained respectively by at least one of the first photosensitive

sites.

However, Okada teaches a camera (Fig. 1) having a single imaging element (Fig.

1: 10) having a color separation circuit (Fig. 1: 100) having a two dimensional register

(Figs. 1: 30 and 3: 30) connected to an interpolation processing circuit (Figs. 1: 34 and

4: 34), said two dimensional register receiving the digitized color values by an A/D

converter (Fig. 1: 48) stored in a frame memory in order to input the color values from a

block surrounding a particular pixel position where a color value is calculated by

interpolation (as shown in fig. 3, the registers (302, 304, 306, 308, 310, 312, 314, 316,

318, and 320) receive serially the color values of the pixels in a block as shown in fig.

2A; col. 7, line 16 – col. 8, line 38). Okada further discloses performing pixel

interpolation for a first photosensitive site configured to measure the level of a first

spectral component in light received by the said first photosensitive site (i.e. Cy 21 as

shown in fig. 2A measuring Cyan) to calculate the value of a second spectral

component (Green color) on said first photosensitive site by using the level of at least a

second photosensitive site configured to measure the level of a second spectral

component (i.e. G10, G12, G32 as shown in figs. 2A and 2C; col. 4, lines 4-33; col. 6,

lines36-65), wherein to interpolate the color values for a pixel position, said interpolation

digitally weights the values of the color being calculated using the color values stored in

the two dimensional register (having plural serial registers storing the colors values for

four lines in a block) based on the distance from the color values used for interpolation

to the position of the pixel to have the colors calculated (Col. 5, line 65 – col. 6, line 19;

col. 6, lines 51-65; col. 7, line 16 – col. 8, line 38; col. 8, lines 59-65).

Therefore, taking the combined teaching of Denyer et al. in view of Okada as a whole, after appreciating the concept of performing pixel interpolation to determine the missing color values of a particular pixel by using the color values of other pixels having the missing color on said particular pixel and the advantages of having serial registers storing the color values for of pixels to be used for estimating the color value of a particular pixel as taught in Okada, one of an ordinary skill in the art would find obvious at the time the invention was made to modify the imager in Denyer et al. to have the interpolator estimating the level of the first spectral component in the light received by at least one of the second photosensitive sites based on at least one measurement of the first spectral component obtained respectively by at least one of the first photosensitive sites and to include at least one serial register for storing digital bit values representing the spectral component measurements from a photosensitive site being interpolated and the photosensitive sites neighboring the photosensitive site being interpolated and to estimate a spectral component level for a photosensitive site, the interpolator digitally weights the values of the spectral component being estimated, as measured by the photosensitive sites providing the measurements and which are currently stored in the at least one serial register, based on the distances of the photosensitive sites providing the measurements from the photosensitive site for which the spectral component is being estimated. The motivation to do so would have been to improve the interpolation processing in the imager by serially storing the color values in the registers so that said color values can be access in a parallel by the interpolation circuit thus receiving the values needed for calculation at the same time and to accurately calculate the missing

colors based on the particular position of the colors used for interpolation thus better

representing the colors and have the output image to better resemble the original color

of the object prior to its image capture and to apply color interpolation to the missing

colors to obtain a value based on the central position.

Regarding claim 27, limitations can be found in claim 26.

Regarding claim 28, the combined teaching of Denyer et al. in view of Okada as

discussed and analyzed in claim 26 further teaches that each second photosensitive

site is configured to measure the level of a second spectral component in light received

by the respective second photosensitive site (taking in consideration green as a first

spectral component for examining purposes, the second spectral components can be

read as red. Denyer et al. discloses measuring red, green and blue colors as discussed

in claim 26 above; see also Okada (col. 4, lines 4-33; col. 6, lines 36-65 and figs. 2A-

2E), wherein a plurality of spectral components is measured), and the interpolator is

further configured to estimate the level of the second spectral component in the light

received by at least one of the first photosensitive sites based on at least one

measurement of the second spectral component obtained respectively by at least one of

the second photosensitive sites (As discussed and analyzed in claim 26, Okada

discloses performing pixel interpolation for a first photosensitive site configured to

measure the level of a first spectral component in light received by the said first

photosensitive site (i.e. Cy 21 as shown in fig. 2A measuring Cyan) to calculate the

value of a second spectral component (Green color) on said first photosensitive site by

using the level of at least a second photosensitive site configured to measure the level

of a second spectral component (i.e. G10, G12, G32 as shown in figs. 2A and 2C; col. 4, lines 4-33; col. 6, lines 36-65). Okada also discloses performing the same operation for the other color components as shown in figs. 2A-2E). Grounds for rejecting claim 26 apply here.

Regarding claim 30, the combined teaching of Denyer et al. in view of Okada as discussed and analyzed in claim 26 further teaches a plurality of third photosensitive sites (i.e. measuring blue) (Denyer et al. discloses measuring red, green and blue colors as discussed in claim 26 above; see also Okada (col. 4, lines 4-33; col. 6, lines 36-65 and figs. 2A-2E), wherein a plurality of spectral components is measured), and the interpolator is further configured to estimate the level of the first spectral component in the light received by at least one of the third photosensitive sites based on at least one measurement of the first spectral component obtained respectively by at least one of the first photosensitive sites in the at least one line transferred out during the read operation, and to estimate the level of the second spectral component in the light received by at least one of the third photosensitive sites based on at least one measurement of the second spectral component obtained respectively by at least one of the second photosensitive sites (As discussed in claim 26 and 28, Okada discloses performing pixel interpolation for a first photosensitive site configured to measure the level of a first spectral component in light received by the said first photosensitive site (i.e. Cy 21 as shown in fig. 2A measuring Cyan) to calculate the value of a second spectral component (Green color) on said first photosensitive site by using the level of at least a second photosensitive site configured to measure the level of a second

spectral component (i.e. G10, G12, G32 as shown in figs. 2A and 2C; col. 4, lines 4-33;

col. 6, lines 36-65). Okada also discloses performing the same operation for the other

color components as shown in figs. 2A-2E. This teaches the operation for the third

photosensitive site as claimed). Grounds for rejecting claims 26 and 28 apply here.

Regarding claim 31, limitations have been discussed in claims 28 and 30

above.

Regarding claim 32, limitations can be found in claims 26, 28 and 30 above.

Regarding claim 33, the combined teaching of Denyer et al. in view of Okada as

discussed and analyzed in claim 26 further teaches a line decoder (Denyer et al., 16

and 18 as shown in fig. 3) located in the substrate and having at least one serial output

for transferring out at least one line of measured spectral components from the array

during a read out operation (Denyer et al., page 11, line 1 - page 12, line 25); an A/D

conversion element (fig. 4: 26) located in the substrate (Denyer et al. discloses that the

A/D converter can be incorporated in the same chip where the imaging array is located;

page 13, lines 1-22; page 12, lines 20-25) and configured to receive the at least one line

of measured spectral components read out from the line decoder and output the

received measurements as digital values to the interpolator (Denyer et al., page 11, line

33 – page 12, line 25), and wherein the interpolator estimates the first spectral

component levels in the second and third photosensitive sites, the second spectral

component levels in the first and third photosensitive sites, and the third spectral

component level in the first and second photosensitive sites based on the digital values

received from the A/D conversion element (Denyer et al., page 11, line 33 – page 12,

line 25). Grounds for rejecting claim 26 apply here.

Regarding claim 34, limitations have been discussed in claim 33 above.

Regarding claim 35, the combined teaching of Denyer et al. in view of Okada as

discussed and analyzed in claim 26 further teaches that the at least one serial output of

the line decoder (Denyer et al., figs. 3: 16 and 3: 18; see also figs. 6: 45, wherein a read

out means may comprise a plurality of shift registers) transfers out several sequential

lines of measured spectral components from the array during each read out operation

(Denyer et al., page 14, line 33 - page 15, line 27; using a plurality of shift registers

would result in outputting a plurality of rows or an image block that would result in

speeding up the readout process). Grounds for rejecting claim 26 apply here.

Regarding claim 37, the combined teaching of Denyer et al. in view of Okada as

discussed and analyzed in claim 26 further teaches an imager (See Denyer et al., figs. 3

and 4), comprising: a semiconductor substrate (by teaching that the imaging array is

located in a chip, Denyer et al. discloses a semiconductor substrate; see page 13, lines

1-22); a plurality of first photosensitive sites (Denyer et al., fig. 3 shows an array of

pixels 2) located in the substrate, wherein each first photosensitive site is configured to

measure the level of a first spectral component in light received by the respective first

photosensitive site (the array in Denyer et al. is divided into three kind of photosensitive

sites (red, green and blue); see fig. 2; page 10, line 23 – page 12, line 32); a plurality of

second photosensitive sites located in the substrate (the array in Denyer et al. is divided

into three kind of photosensitive sites (red, green and blue); see fig. 2; page 10, line 23

– page 12, line 32), each second photosensitive site is configured to measure the level

of a second spectral component in light received by the respective second

photosensitive site (taking in consideration green as a first spectral component for

examining purposes, the second spectral components can be read as red. Denyer et

al. discloses measuring red, green and blue colors as discussed in claim 26 above; See

also Okada (col. 4, lines 4-33; col. 6, lines 36-65 and figs. 2A-2E), wherein a plurality of

spectral components is measured); and an interpolator (Denyer et al. discloses a

processing unit (Fig. 4: 28) to perform color interpolation to the red, green and blue

signals to form synchronous, parallel color channel signals for the video signal before

being output to a display unit (Fig. 4: 30); page 11, line 33 – page 12, line 25) located in

the substrate (Denyer et al. discloses that the processing unit can be incorporated in the

same chip, where the imaging array is located; page 13, lines 1-22) and configured to

receive digital data (output from an A/D converter 26 as shown in fig. 4; page 11, line 33

– page 13, line 23) representing the spectral component levels measured in the

photosensitivity sites, and to estimate the level of the first spectral component in the

light received by at least one of the second photosensitive sites based on at least one

digitized measurement of the first spectral component obtained respectively by at least

one of the first photosensitive sites (Denyer et al. discloses reconstructing the image

colors of each pixels by performing interpolation to obtain an RGB value for each pixel

location. Furthermore, as discussed and analyzed in claim 26, Okada discloses

performing pixel interpolation for a first photosensitive site configured to measure the

level of a first spectral component in light received by the said first photosensitive site

(i.e. Cy 21 as shown in fig. 2A measuring Cyan) to calculate the value of a second

spectral component (Green color) on said first photosensitive site by using the level of

at least a second photosensitive site configured to measure the level of a second

spectral component (i.e. G10, G12, G32 as shown in figs. 2A and 2C; col. 4, lines 4-33;

col. 6, lines 36-65). Okada also discloses performing the same operation for the other

color components as shown in figs. 2A-2E) (Page 10, line 23 – page 13, line 22).

Grounds for rejecting claim 16 apply here.

Regarding claim 38, limitations of claim 38 have been discussed and analyzed

in claims 26, 28, 30 and 31.

Regarding claim 40, limitations can be found in claim 32 and 38 above.

Regarding claim 42 and 43, limitations have been discussed and analyzed in

claim 26.

Regarding claim 44, Denyer et al. discloses an imaging device (See figs. 3 and

4), comprising: a display (Fig. 4: 30) for displaying an image on an array of M x N pixels

(page 11, line 33 – page 12, line 25); and an imager (Fig. 3: 1 and 4: 1) which

comprises a substrate (by teaching that the imaging array is located in a chip, Denyer et

al. discloses a semiconductor substrate; see page 13, lines 1-22), an M x N array of

photosensitive sites located on the substrate (fig. 3 shows an M x N array of pixels 2),

the array including a plurality of first photosensitive sites located in the substrate (the

array in Denyer et al. is divided into three kind of photosensitive sites (red, green and

blue); see fig. 2; page 10, line 23 – page 12, line 32), wherein each first photosensitive

site is configured to measure the level of a first color (i.e. green) component in light

received by the respective first photosensitive site, and a plurality of second

photosensitive sites (the array in Denyer et al. is divided into three kind of

photosensitive sites (red, green and blue); see fig. 2; page 10, line 23 – page 12, line

32) located in the substrate, wherein each second photosensitive site is configured to

measure the level of a second color component in light received by the respective

second photosensitive site (taking in consideration green as a first spectral component

for examining purposes, the second spectral components can be read as red. Denyer

et al. discloses measuring red, green and blue colors as discussed in claim 26 above);

and an interpolator (Denyer et al. discloses a processing unit (Fig. 4: 28) to perform

color interpolation to the red, green and blue signals to form synchronous, parallel color

channel signals for the video signal before being output to a display unit (Fig. 4: 30);

page 11, line 33 – page 12, line 25) located in the substrate (Denyer et al. discloses that

the processing unit can be incorporated in the same chip, where the imaging array is

located; page 13, lines 1-22) and configured to receive digitized color component values

corresponding to the measurements obtained in the first and second photosensitive

sites, to estimate the level of the color component in the light received by at least one of

the second photosensitive sites based on at least one digitized color component value

obtained respectively from at least one of the other photosensitive sites, and to estimate

the level of the second color component in the light received by at least one of the other

photosensitive sites based on at least one digitized color component value obtained

respectively from at least one of other photosensitive sites (Denyer et al. discloses

reconstructing the image colors of each pixels by performing interpolation to obtain an

RGB value for each pixel location) (Page 10, line 23 – page 13, line 22).

Although Denyer et al. discloses performing interpolation to the received digitized

color components to reconstruct the image to produce a fur RGB image, Denyer et al.

does not explicitly disclose receiving said digitized color component values

corresponding to the measurements obtained in the first and second photosensitive

sites, to estimate the level of the first color component in the light received by at least

one of the second photosensitive sites based on at least one digitized color component

value obtained respectively from at least one of the first photosensitive sites, and to

estimate the level of the second color component in the light received by at least one of

the first photosensitive sites based on at least one digitized color component value

obtained respectively from at least one of the second photosensitive sites.

However, Okada teaches a camera (Fig. 1) having a single imaging element (Fig.

1: 10) having a color separation circuit (Fig. 1: 100) having a two dimensional register

(Figs. 1: 30 and 3: 30) connected to an interpolation processing circuit (Figs. 1: 34 and

4: 34), said two dimensional register receiving the digitized color values by an A/D

converter (Fig. 1: 48) stored in a frame memory in order to input the color values from a

block surrounding a particular pixel position where a color value is calculated by

interpolation (as shown in fig. 3, the registers (302, 304, 306, 308, 310, 312, 314, 316,

318, and 320) receive serially the color values of the pixels in a block as shown in fig.

2A; col. 7, line 16 – col. 8, line 38). Okada further discloses performing pixel

interpolation for a first photosensitive site configured to measure the level of a first

spectral component in light received by the said first photosensitive site (i.e. Cy 21 as

shown in fig. 2A measuring Cyan) to calculate the value of a second spectral

component (Green color) on said first photosensitive site by using the level of at least a

second photosensitive site configured to measure the level of a second spectral

component (i.e. G10, G12, G32 as shown in figs. 2A and 2C; col. 4, lines 4-33; col. 6,

lines36-65); Okada further teaches performing the same process for the other

photosensitive sites configured to measure other spectral components, wherein to

interpolate the color values for a pixel position, said interpolation digitally weights the

values of the color being calculated using the color values stored in the two dimensional

register (having plural serial registers storing the colors values for four lines in a block)

based on the distance from the color values used for interpolation to the position of the

pixel to have the colors calculated (Col. 5, line 65 – col. 6, line 19; col. 6, lines 51-65;

col. 7, line 16 – col. 8, line 38; col. 8, lines 59-65).

Therefore, taking the combined teaching of Denyer et al. in view of Okada as a

whole, after appreciating the concept of performing pixel interpolation to determine the

missing color values of a particular pixel by using the color values of other pixels having

the missing color on said particular pixel and the advantages of having serial registers

storing the color values for of pixels to be used for estimating the color value of a

particular pixel as taught in Okada, one of an ordinary skill in the art would find obvious

at the time the invention was made to modify the imager in Denyer et al. to have the

interpolator receiving said digitized color component values corresponding to the

measurements obtained in the first and second photosensitive sites, to estimate the

level of the first color component in the light received by at least one of the second photosensitive sites based on at least one digitized color component value obtained respectively from at least one of the first photosensitive sites, and to estimate the level of the second color component in the light received by at least one of the first photosensitive sites based on at least one digitized color component value obtained respectively from at least one of the second photosensitive sites and to include at least one serial register for storing digital bit values representing the spectral component measurements from a photosensitive site being interpolated and the photosensitive sites neighboring the photosensitive site being interpolated and to estimate a spectral component level for a photosensitive site, the interpolator digitally weights the values of the spectral component being estimated, as measured by the photosensitive sites providing the measurements and which are currently stored in the at least one serial register, based on the distances of the photosensitive sites providing the measurements from the photosensitive site for which the spectral component is being estimated. The motivation to do so would have been to improve the interpolation processing in the imager by serially storing the color values in the registers so that said color values can be access in a parallel by the interpolation circuit thus receiving the values needed for calculation at the same time and to accurately calculate the missing colors based on the particular position of the colors used for interpolation thus better representing the colors and have the output image to better resemble the original color of the object prior to its image capture and to apply color interpolation to the missing colors to obtain a value based on the central position.

Regarding claim 45, limitations can be found in claim 28 above.

Regarding claim 46, limitations can be found in claims 28, 30 and 35 above.

Regarding claim 47, limitations can be found in claims 28, 30 and 35 above.

Regarding claim 48, limitations can be found in claim 28 above.

6.   **Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Denyer et al., WO 97/20434 in view of Okada, US Patent 6,133,953 and further in view of Acharya, US Patent 6,091,851.**

Regarding claim 41, the combined teaching of Denyer et al. in view of Okada fails to teach that the interpolator output twenty four bits of color data for each photosensitive site, with each color value being represented by eight bits.

However, Acharya teaches the concept of performing color recovery of imager captured by a camera (Fig. 3: 330) using a single sensor having a Bayer pattern color filter array in order to obtain a full resolution image from an object (Fig. 3: 340) being photographed, wherein the individual color components of each pixel area represented by eight bits (in order to represent a color intensity range from 0-255) and the pixels of the image after interpolation is performed would have a total resolution of twenty four bits (Col. 1, lines 4-48; col. 2, lines 40-52; col. 3, lines 16-41; col. 5, line 26 – col. 6, line 26; col. 9, lines 1-8). Acharya also discloses that the interpolation method can be performed by hardware and firmware and that the interpolation method can be performed by the camera processor (Fig. 3: 32) (Col. 10, lines 7-17).

Therefore, taking the combined teaching of Denyer et al. in view of Okada and further in view of Acharya as a whole, one of an ordinary skill in the art, after appreciating the advantages of the interpolation method of Acharya, would find obvious at the time the invention was made to modify the imager of Denyer et al. and Okada by having the interpolator output twenty four bits of color data for each photosensitive site, with each color value being represented by eight bits. The motivation to do so would have been to have a desirable amount of color intensity values (256 color intensity values) for each color of each pixel in the image and to better represent luminance in recovering missing color components to have the output image to better resemble the original color of the object prior to its image capture.

Conclusion

7.   Because new grounds of rejection have been made to reject unamended **claim 44**, this Action is made **Non-Final.**

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nelson D. Hernández whose telephone number is (571)272-7311. The examiner can normally be reached on 9:00 A.M. to 5:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lin Ye can be reached on (571) 272-7372. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

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Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Nelson D. Hernández
Examiner
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